NASA Rules Review and Impact on Safety and Mission Assurance Directives

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"Mission success stands on the foundation of our unwavering commitment to safety"

Administrator Sean O'Keefe January 2003

Agenda

- Status of Identification and Review of All Internal NASA Rules Review
- Status of Documentation in Normal Development Process

Status of Identification and Review of All Internal NASA Rules Review

Associate Deputy Administrator for Institutions and Asset Management initiated a review of all internal NASA rules on 5 December 2003

- Remove ambiguity regarding requirements within NASA Procedures and Guidelines (NPGs)
- Eliminate unneeded requirements
- Convert all NPGs to NASA Procedural Requirements (NPRs)

Status of Identification and Review of All Internal NASA Rules Review

- GOAL: Clearly defined Agency requirements without any ambiguity concerning application
- SCOPE: 433 documents identified in the initial document inventory (expect more to be identified when the Codes report back)
  - 128 NPDs
  - 91 NPRs
  - 214 Headquarters Directives
  - (Approximately 9400 pages [based on preliminary inventory])
- SCOPE (S&MA): 30 Agency-level documents
  - 13 NPDs
  - 13 NPRs
  - 4 NASA-Standards
  - (Approximately 800 pages [based on preliminary inventory])

Status of Identification and Review of All Internal NASA Rules Review

APPROACH:

- Phase 1 – Complete inventory analysis and report to management. (5 March 2004)
- Phase 2 – Complete initial document revisions (31 March 2004)
  - Delete requirements that are no longer needed (and any associated explanatory material)
  - Highlight requirements statements to distinguish from explanatory material and useful information
  - Post deletions/revisions on Web (NODIS) for 2 week all-Code review, adjust on an exception basis
  - Certify via memo that ambiguity regarding requirements has been removed

Status of Identification and Review of All Internal NASA Rules Review

APPROACH (Continued):

- **Phase 3 – Implement longer term adjustments to the requirements set as a part of the standard NODIS 5 year review cycle potentially including:**
  - **Adopt standard terminology to define a requirement**
  - **Establish a clear document hierarchy**
  - **Restructure documents to provide better traceability of requirements (for example one requirement per paragraph)**
  - **Identify candidates for merging documents**
  - **Develop a style guide for documents**
  - **Codify "rules to make rules" through a revision of NPR 1400.1, NASA Directives System Procedural Requirements**

Status of Identification and Review of All Internal NASA Rules Review

What does this mean for SMA in the short-term?

- Code Q has analyzed all SMA Directives and is developing redline versions of the documents to be placed in NODIS for the 2 week all-Code review
- Analysis included
  - Duplicative requirements
  - Vague requirements
  - Obsolete requirements

Status of Identification and Review of All Internal NASA Rules Review

What does this mean for SMA in the short-term? (Continued)

- Code Q redlines
  - Identify requirements/text to be eliminated
  - Identify requirement statements (the word "Requirement" in parenthesis follows each requirement statement)
  - Identify minor administrative changes (updating references and organizations to reflect current status)
- Draft Code Q redlines are being provided to Center SMA Directors as quickly as they are developed prior to the NODIS 2 week all-Code review.
  - First batch including all NPDs was delivered the week of 16 February
  - Second batch was delivered the week of 23 February
- By 31 March 2004 there will be a revised set of SMA Directives that clearly differentiate between requirements and guidance

Status of Identification and Review of All Internal NASA Rules Review

What does this mean for SMA in the long-term?

- All directives will need to be rewritten to reflect the new "rules to make rules" requirements
- Center-level directives will also need to be updated
  - Schedule – TBD
  - Scope/Approach – TBD
  - Relationship with Agency-level update - TBD

Status of Identification and Review of All Internal NASA Rules Review

What does this mean for SMA in the long-term?

- Code Q is working with the committee establishing the "rules to make rules". Items under discussion include"
  - Clearly identifying requirements
    - Highlight requirements (similar to structure of NPR 8705.2 (Human Rating), OR
    - Remove everything that isn't a requirement from Directives and place in a separate document (Handbook for example)
  - One requirement per paragraph
  - Use of standard terminology to denote requirements (use of shall)
  - Requirement should appear in one place only
  - Each requirement must be verifiable
  - Clear document hierarchy

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What does this mean for SMA in the long-term? (Continued)

- Additionally Code Q is considering additional internal rules for use in our directives
  - Consolidation of NPDs into NPRs where appropriate
  - Restructuring the SMA Document Tree
    - Establish a master NPD (Potentially including Health and Environment policy)
    - Limit the number of NPRs (Potentially a System Safety NPR, Operational Safety NPR, Mission Assurance NPR, and a SMA Process NPR)
    - Eliminate directive information from NASA-STDs and incorporate into Directives (Roles and Responsibilities for example)
  - Standardizing structure of NPRs
    - Standard locations for information (Definitions, Charters, Required Reports)
    - Standard phrasing for Actors
    - Standard approach for cross-referencing to other documents/requirements
    - Ensure that each requirement identifies who or what the requirement applies to
- Increased use of requirements database
  - Tool for requirements maintenance
  - Tool for requirements users to identify responsibilities by role
  - Form basis for requirements verification matrix (verification method, who

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Next Steps for Center SMA Community

- Review draft SMA directives redlines
- Review all redlined directives once they are placed in the 2 week all-Code review
- Provide any “rules to make rules” suggestions to Code Q
- Prepare for rigorous enforcement of all NASA Directives

Status of Documentation (Directives and Standards) in Normal Development Process

- **NPR 8621.1A, NASA Procedural Requirements for Mishap Reporting, Investigating, and Recordkeeping**
  - Provides requirements that specify how to respond to any mishap or close call from discovery through corrective action and closure
  - Signed 11 February 2004
- **NPR 8705.Draft 7, Probabilistic Risk Assessment (PRA) Procedures for NASA Programs and Projects**
  - Describes a recommended approach for performing quantitative risk assessment and the extent to which this approach should be applied to the vast spectrum of NASA programs ranging from human flight to small robotic science missions
  - Due to Directives Management by March 13, 2004
  - 4 Concurrences as of 17 Feb. 2004

Status of Documentation (Directives and Standards) in Normal Development Process

- **NPR 8715.Draft 1, Range Safety Program**
  - NASA's range safety policy, roles and responsibilities, requirements, and procedures for protecting the safety and health of the public, the workforce, and property during range operations
  - This policy represents NASA's response to CAIB Observation 10.1-1
  - Removed from NODIS review pending an interdisciplinary team review
- **NASA-GB- 8739.13, NASA Software Safety Guidebook**
  - Provides information and guidance on the process of creating and assuring safe software
  - Replaces NASA-GB-1740.13-96, NASA Guidebook for Safety Critical Software Analysis and Development
  - In signature process as of 17 Feb. 2004